CHEMICAL & BIOMOLECULAR ENGINEERING

The PinPoint

Plasma at the touch of a button

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Problem Statement

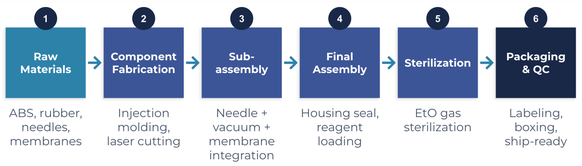
Healthcare is **rapidly decentralizing**, yet blood collection and processing remain dependent on centralized laboratories. This creates a critical gap: there is no easy, standardized way to generate lab-grade blood components outside of lab settings.

As a result, **sample quality becomes highly variable.** Up to 29-35% of point-of-care testing errors originate from poor sample collection, leading to redraws, delays, and unreliable results. In clinical trials, this can mean lost data, extended timelines, and increased costs.

Despite advances in diagnostics, the process of obtaining high-quality plasma or other blood components is **still slow, labor-intensive, and requires specialized equipment** like centrifuges.

We were motivated to solve this problem by enabling fast, reliable, and standardized blood processing at the point of collection, **eliminating the dependency on lab infrastructure.**

Manufacturing Plan



Our goal was to design a **low-cost, scalable** manufacturing process for high-volume production while maintaining strict quality and sterility. PinPoint uses established methods, including injection molding, membrane fabrication, and modular integration. Final assembly includes reagent loading, sealing, and EtO sterilization.

Production **scales from 100K to 1M units/year** through parallel manufacturing lines, eliminating redesign. This approach reduces capital risk and enables rapid expansion, supporting strong unit economics and reliable deployment across clinical and decentralized settings.

Our Solution

PINPOINT IS...

A simple, painless way to collect blood: no visible needles & no training required.

What It Does

- Collects a small blood sample from your upper arm
- Separates out the usable part (plasma) automatically
- Prepares it for lab testing or instant results: no extra equipment needed

HOW DOES IT WORK?

Simple Process

1. Collect

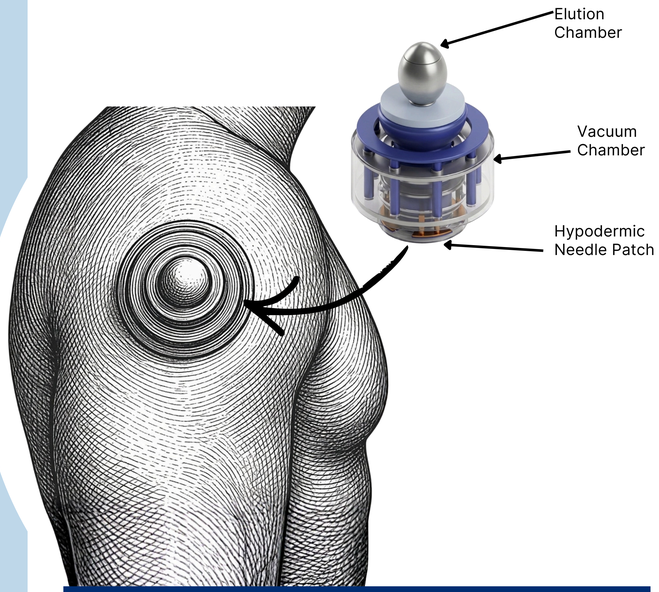
- Stick the device on your upper arm
- Press the plunger - tiny micro-needles will gently collect blood using vacuum suction
- No pumping, no pain, no phlebotomist

2. Filter

- A specialized membrane traps red blood cells
- Clean plasma passes through, ready for testing
- Happens automatically inside the device

3. Recover

- Twist off the top and squeeze the built-in dropper
- Out comes a clean liquid sample
- Use it on a test strip or send it to a lab



Why Plasma

Accelerating clinical decision-making by delivering lab-grade plasma in minutes at the point of collection. Downstream applications include:

- **Oncology:** Leukemia MRD monitoring and ctDNA liquid biopsies
- **Cardiology:** Rapid Troponin and BNP for emergency heart triage
- **Infectious Disease:** Viral load (HIV/HCV) and malaria screening
- **Critical Care:** Early sepsis identification via Lactate levels
- **Hematology:** PT/INR and D-Dimer coagulation assessments
- **Neurology:** Emerging plasma-based Alzheimer's biomarkers

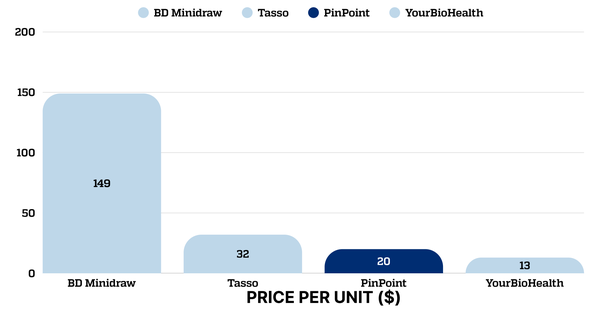
Product Economics

COMPETITIVE LANDSCAPE

What Sets Us Apart

- No prior patents block us. Our unique combination of vacuum, microneedles & on-device filtering
- Competitors (Tasso, YourBio) already partner with Mass General and JHU ICTR: proving strong market demand
- We go further. Tasso and YourBio can't separate blood or run instant tests on-device: PinPoint can

COMPETITIVE PRICING

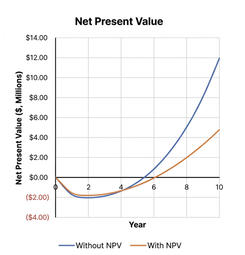


- $20 per device
- 12.7× markup: right in line with the industry standard (5–20× for medical devices)
- Strong margins while staying affordable for clinics, researchers, and partners

Component	Qty	Volume	Material	Cost
Housing	32 g	30 cm^3	ABS	**$0.10**
Rubber seals	6 g	5 cm^3	Silicone	**$0.03**
Vivid membrane	1 pc	2 cm^2	Polysulfone	**$0.55**
Glass fiber pad	1 pc	2 cm^2	Borosilicate fiber	**$0.20**
PBS buffer	1 mL	—	1× sterile, pH 7.4	**$0.08**
Needles ×20	20 pcs	—	3 mm, 26 gauge	**$0.40**
Total				**$1.36**

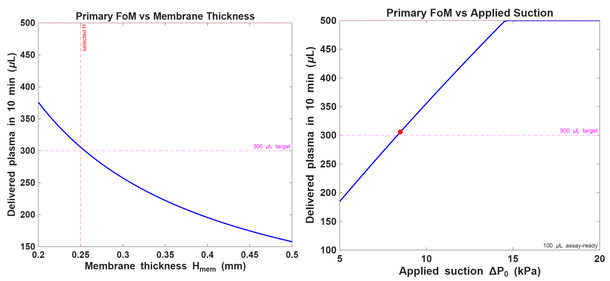
Financial Analysis

Cost	Yr 2	Yr 3+
Capital	$729K	-
Labor	$1.51M	$1.51M
Manufacturing	$1.01M	$1.01M
Materials	$158K	$1.58M
Warehouse	$150K	$150K
Distribution & Marketing	$1.25M	$1.25M
Total	**$3.9M**	**$4.6M**
15% Conting.	**$4.6M**	**$5.3M**



Break-even: Year 5-6
NPV with discounting: $4.8M

Engineering Optimization and Model



FoM:
Delivered plasma in 10 min, capped by 500 uL reservoir volume

$$Q(t) = \left(\frac{k_{eff} A_{mem}}{\mu H_{mem}}\right) \Delta P(t) \qquad \frac{dV}{dt} = Q(t)$$

$$A_{mem} = \pi \left(R^2_{mem,out} - R^2_{core}\right)$$

Outer radius of annular membrane = 18.00 mm
Membrane thickness = 0.250 mm
Applied suction pressure difference = 8.5 kPa
Initial Q = 32.60 $\mu L/min$
Average Q over 10 min = 30.56 $\mu L/min$
Delivered in 10 min = 305.6 μL
Time to 100 uL = 3.13 min

The New Point of Care

PinPoint enables rapid, on-site generation of lab-grade plasma, reducing processing time from **30 min to 5-10 mins** while lowering sample failure rates. This improves workflow efficiency, increases throughput, and enhances data reliability across clinical trials and diagnostic settings.

By **minimizing redraws and reducing reliance** on centralized lab infrastructure, PinPoint decreases labor burden and enables same-visit sample readiness, accelerating clinical decision-making and study timelines.

At scale, this results in significant **cost savings at an estimated $8.6M annually** across 100 clinical trial sites, while improving patient experience and operational efficiency.

With **a $11.6B total addressable market**, PinPoint is positioned to expand access to high-quality diagnostics and support large-scale, high-quality biological data generation.